

Novel Tunable Dye Laser for Lidar Detection, Phase I

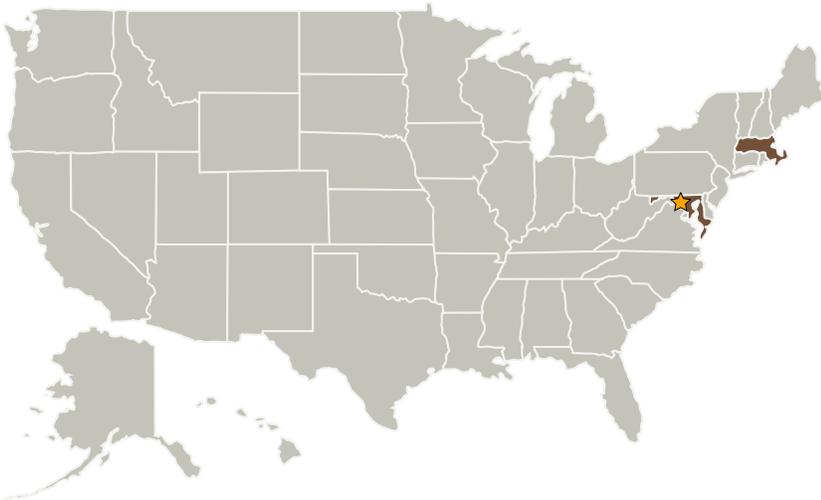
Completed Technology Project (2005 - 2006)



Project Introduction

A tunable dye laser for Lidar detection will be fabricated based on the innovative dye-doped Holographic Polymer Dispersed Liquid Crystals (HPDLC) technology. The demonstration of the tunable lasing of dye-doped holographic polymer dispersed liquid crystal is the main focus during the Phase-I research, while the commercial tunable-laser product will be realized in Phase-II. By carefully choosing the materials including liquid crystal, UV-polymerizable monomer, emitter dye and optimizing the holographic-writing process, dye-doped HPDLC is formed as an one-dimensional photonic bandgap material, Mirrorless Lasing in the dye-doped HPDLC occurs at the reflection band edges. Applied voltage tunes the reflection peak of the HPDLC as well as the center wavelength of emitting laser. The whole laser device is solid state and highly resistant to shock and vibration as it has no moving parts. Since the innovative laser device is based on the thin film technology, there is no bulky laser cavity and the cost of the HPDLC thin films are low due to easy-to-achieve large scale manufacturing. The unit price of the HPDLC thin film can be so low that it is economical to throw away and replace a HPDLC thin film device once the dye reaches the end of its life.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Goddard Space Flight Center (GSFC)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Goddard Space Flight Center(GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland
Scientific Solutions	Supporting Organization	Industry	North Chelmsford, Massachusetts

Primary U.S. Work Locations	
Maryland	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.1 Materials
 - └ TX12.1.7 Special Materials